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The purpose of this index is to identify U.S. Navy and U.S. Air Force transparencies, films, and manuals which can be used by schools and colleges to teach basic electricity. Materials are classified according to 39 major categories including Electron Theory, Batteries and Battery Connections, D.C. Series Circuits, Network Theorems, Electromagnetism and Magnetic Circuits, Basic Electrical Indicating Instruments, Transformers, A.C. Motors, and Wiring Techniques. Some categories include films produced by other educational agencies or private firms. The six publications, three sources of transparencies, and 34 films classified in this index were selected by representatives of State Departments of Education in Washington, Idaho, Oregon, Colorado, and Utah. The sources have been assigned code numbers, and materials within code categories are listed by code number. (CH)

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PA-08

FINAL REPORT
Project No. OE7-0031
Contract No. OEG-4-7-070031-1626
Report No. 29

INSTRUCTOR'S INDEX OF U.S. NAVY AND AIR FORCE MATERIALS FOR TEACHING BASIC ELECTRICITY. Final Report

August 1968

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

ED 023912

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INSTRUCTOR'S INDEX OF U.S. NAVY AND AIR FORCE MATERIALS FOR TEACHING BASIC ELECTRICITY, Final Report, 29.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Project No. OE7-0031
Contract No. OEG-4-7-070031-1626
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2

Alan Stoller

August 1968

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Dep~~artment~~ of Education, Washington State Univ~~ersity~~, Pullman, Washington
State Coordinating Council For Occupational Education, Olympia, Washington
Washington

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INTRODUCTION

General Usefulness of Non-Classified Department of Defense Instructional Materials

This is primarily an index of U.S. Navy and U.S. Air Force transparencies, films and manuals that can be used by schools and colleges to teach Basic Electricity.

Many vocational educators have sought systematic access to non-classified instructional materials developed by U. S. Department of Defense.

In accord with a September 20, 1967 conversation with Dr. Robert Morgan, confirmed by paragraph 2 of our September 25, 1967 letter to Project Director, Sidney High, a portion of Project 0031 funds were used to obtain visual aids developed by the U.S. Naval Training Aids Center at Treasure Island. Larry Braaten of the USOE Bureau of Research was very helpful in making arrangements. After clearance with appropriate naval officials, Clifford Welch, Director of the Treasure Island Naval Training Aids Center arranged for review of generally useful non-classified visual aids and publications.

This Index classifies items into the 42 units listed in the Table of CONTENTS.

For some units films produced by other educational agencies and private firms are also listed.

Indexed items were selected by representatives of State Departments of Education from Washington, Idaho, Oregon, Colorado and Utah. State Vocational Education Director of Washington, Idaho, Alaska, Oregon and Montana reviewed this Index at an August 28, 1968 meeting sponsored by the Northwest Regional Educational Laboratory. They recommended dissemmation of the Index and development of similar indexer for other areas of occupational education.

In cooperation with the above five State Departments, the Northwest Regional Educational Laboratory is exploring ways of implementing that recommendation.

Use of This Index

Code numbers of items listed for each unit refer to those shown at the left of items listed in the section titled CODE NUMBERS OF ITEMS INDEXED.

For example look at page 3-1.

Under Publications, item 1, "NAVPERS 10086-A, pp. 4-6" means Basic Electricity, Bureau of Naval Personnel, Navy Training Course; Revised, 1964.

Under Transparencies, item 1, "NAVPERS 7053-11-2-" means the transparency carrying that code number at the Treasure Island U.S. Naval Training Aids Center.

Under Motion Pictures, item 1, "A-9" means Electrostatics Encyclopedia Britannica.

Blank spaces on the pages of this Index can be used by State Curriculum Supervisors and instructors to record other instructional materials they think useful for each unit.

CODE NUMBERS OF ITEMS INDEXED

PUBLICATIONS

1. Basic Electricity, NAVPERS 10086-A, Bureau of Naval Personnel, Navy Training Course, Revised, 1964, United States Government Printing Office, Washington: 1960. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price $3.50
2. Fundamentals of Electronics, AF Manual 101-8, Department of the Air Force, Reprinted July, 1964, with change A included. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $4.00
3. Electronic Circuit Analysis, AF Manual 52-8, Vol. 1, Department of the Air Force, Reprinted, Nov., 1965, with change A included. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
4. Construction Electrician 3 & 2, NAVPERS 10636-F, Bureau of Naval Personnel, Naval Training Course, Revised, 1966.
5. Basic Electronics, NAVPERS 10087-B, Bureau of Naval Personnel, Navy Training Course, Revised, 1968
6. Introduction to Electronics, NAVPERS 10084, Bureau of Naval Personnel, Navy Training Course, United States Government Printing Office, Washington 25, D. C., 1963.

TRANSPARENCIES

Basic Electricity, NAVPERS 70503 Series, Bureau of Naval Personnel.

Films and other graphic materials:

1. Audio-Visual Center, Washington State University, Pullman, Washington.
2. Audio-Visual Library, Central Washington State College, Ellensburg, Washington.

FILMS AVAILABLE FROM THE AUDIO-VISUAL CENTER
WASHINGTON STATE UNIVERSITY
PULLMAN, WASHINGTON

A-1. Amperes, volts and ohms
U.S. Navy 1945
10 min. sd and b&w (s)-c

Summary: Radio Technician Training series. Defines the terms: amperes, volts, and ohms and explains their relationships with each other (Ohm's law); how instruments are used to measure these quantities.

A-2. Capacitance
U.S. Navy 1943
31 min. sd b&w (s)-(c)

Summary: Radio Technician Training series. Demonstrates the flow of electrons through a circuit and shows charging and discharging of condensers; behavior of capacitance with alternating current.

A-3. Cathode ray oscilloscope
U.S. Navy 1944
20 min. sd b&w (s)-(c)

Summary: Purpose and general principles of operation of the cathode ray oscilloscope; operating checks.

A-4. Cathode ray tube--how it works
U.S. Navy 1943
11 min. sd b&w (s)-(c)

Summary: Construction and function of each part of the cathode ray tube; how it produces visual images on the screen.

A-5. Current and electromotive force
U.S. Navy 1945
10 min. sd b&w j-(s)-c

Summary: Radio Technician Training series. Electron theory; arrangement of molecules; building up of current; conductors; electromotive force; resistance.

A-6. Electromagnets: How they work
Encyclopedia Britannica 1960
10 min. sd b&w

Summary: How the electromagnet is constructed, how it functions, and ways that its strength can be increased, presented in a series of demonstrations.

A-7. Electron: an introduction
U.S. OFF. EDUC. 1944
16 min. sd b&w (s)-c

Summary: Nature of electrons; electron flow in solid conductors; electromotive force; control and types of electron flow; electron flow and magnetic fields; induced electron flow.

A-8. Electron theory
U.S. Navy 1954
5 min. sd b&w (s)-c

Summary: Animated drawings show representative atom with electrons orbiting, explains neutral atom, electron and atom with one positive charge; how current flow depends on electron motion.

A-9. Electrostatics
Encyclopedia Britannica 1951
11 min. sd b&w j-(s)-c

Summary: Static electricity as fundamental to an understanding of the modern theories of electricity; how positive and negative electrification are produced.

A-10. Flow of electricity
Young Amer. 1946
10 min. sd b&w (i)-(j)

Summary: Characteristics of electricity and electric circuits through demonstrations and diagrams.

A-11. Inductance
U.S. Navy 1943
35 min. sd b&w (s)-(c)

Summary: Radio Technician Training series. How magnetic force reacts around a coil; self inductance and how to increase its value; how to increase inductance of a coil.

A-12. Learning about electric current
Encyclopedia Britannica 1955
8 min. sd b&w (i)-j

Summary: The nature and characteristics of current, electricity; animation and simple demonstrations explain circuits, conductors, insulators, electromagnetism and electricity as a form of useful energy.

A-13. Magnetic, electric and gravitational fields
Encyclopedia Britannica 1961
11 min. sd col (i)-j

Summary: Basic Physical Science series. Characteristics and effects of magnetic, electrical, and gravitational fields demonstrated by numerous experiments supplemented by animated drawings explaining the phenomena observed.

A-14. Magnetic Force
Natl. Acad. Sci. 1960
28 min. sd col

Summary: Planet Earth series. History of man's knowledge of the earth's magnetic field; current understnadings and theories about the nature and extent of and variations in the earth's field, recent studies and measurements of magnetic phenomena.

A-15. Magnetism
Encyclopedia Britannica 1954
16 min. sd b&w

Summary: The laws of polarity, magnetic field and terrestrial magnetism, leading to an understanding of atomic fields; variety of modern applications of magnetism and importance to technology.

A-16. Periodic functions
U.S. Navy 1943
17 min. sd b&w (s)-c

Summary: Radio Technician Training series. Demonstration of a periodic function sine waves; alternating current as a sine function; how AC generators differ in voltage, frequency, and phase; result of combining voltages from two generators not in phase.

A-17. Principles of electricity
Gen. Elec. 1965
20 min. sd col j-(s)-c

Summary: Basic concepts of electrons and electron flow, positive and negative charges, current, voltage, resistance, and fundamental methods of generating electricity.

A-18. Principle of the generator
Young Amer. 1949
10 min. sd b&w i-(j)

Summary: Elementary principles of electro-magnetic induction, with their relation to the operation of the generator shown by animation.

A-19. RCL: resistance capacitance
U.S. Navy 1943
18 min. sd b&w (s)-c

Summary: Radio Technician Training series. Current and voltage in relation to time; voltage and current curves; how current leads voltage and voltage leads current in different instances; relation of current and voltage.

A-20. Series and parallel circuits
U.S. Navy 1944
7 min. sd b&w (s)-c

Summary: Radio Technician Training series. Current flow and voltage drop in series and parallel circuits.

A-21. Story of magnetism
United World 1960
15 min. sd col

Summary: History of discoveries and development of our understanding of magnetism; demonstrations of numerous magnetic phenomena and relationships between magnetism and electricity.

A-22. Story of the modern storage battery
U.S. Bur. Mines 1960
27 min. sd col j-(s)-c

Summary: Demonstrations of forms of the primary cell and how the principles apply to the construction and functioning of the storage battery; the chemistry of the storage battery; how the battery is made; battery failure and care.

A-23. Volt-ohmmeter operation
U.S. Navy 1944
15 min. sd b&w (s)-c

Summary: Radio Technician Training series. How to operate Weston (and other types) voltohmmeter to measure ohms and volts; selection of proper scale; adjustment for zero scale; set-up for D.C. or A.C. current.

A-24. What is electricity?
Encyclopedia Britannica 1954
14 min. sd b&w j-(s)

Summary: Classical electrostatic experiments; electromagnetism experiments of Oerstad and Faraday; industrial applications of electricity; organization of atoms.

FILMS AVAILABLE FROM THE AUDIOVISUAL LIBRARY
CENTRAL WASHINGTON STATE COLLEGE
ELLENSBURG, WASHINGTON

B-1. Coulomb's Law
Educational Services, 1959
28 min. sd b&w s-c

Summary: Physical Science Study Committee series. Eric Rogers demonstrates the inverse square variation of electric force with distance, and illustrates the fact that electric force is directly proportioned to charge. He discussed the inverse square idea, and tests the inverse square law by looking for electrical effects inside a charged hollow sphere.

B-2. Electrical Safety in the Home
Stout State College, 1960
14 min. sd col s-(c)

Summary: A young boy and his father use an inspection sheet as a guide in checking their home for electrical hazards. Depicts proper means of preventing or correcting electrical hazards. Principles of electrical safety are dramatized by flashbacks to portions of low-voltage electrical demonstrations by H. C. Potthast.

B-3. Electromagnets
Young American Films, 1949
11 min. sd b&w (i)-j-c

Summary: Theory of electromagnetism, from a common bar magnet to a simple homemade electromagnet; how the electromagnet is used in the doorbell, telegraph set and other everyday applications.

B-4. Elements of Electrical Circuits
Encyclopaedia Britannica Films, 1943
10 min. sd b&w j-(s)

Summary: Phenomena related to circuits: flow of electrons conductors; insulators; factors affecting resistance; ohm; rate of flow and ampere; electromotive force; volt; and Ohn's Law. Common relations in a simple circuit.

B-5. Magnets
Young American Films, 1946
13 min. sd b&w (p)-i

Summary: Essential facts about nature of magnets; simple magnets only, not electromagnets.

B-6. Making Electricity
Encyclopaedia Britannica Films, 1949
10 min. sd b&w (i)-j

Summary: How electricity is made by moving a coil of wire through the field of a magnet.

B-7. Primary Cell
Encyclopaedia Britannica Films, 1944
11 min. sd b&w j-s-c

Summary: Several phenomena of battery cells; animation shows electron action, ionization of electrolyte, electron flow, action at electrodes, polarization and depolarization. Operating characteristics of cell and several cells (or battery) in series and parallel circuits.

COMPREHENSIVE LIST OF MEDIA MATERIALS IN BASIC ELECTRICITY

16 mm Motion Pictures

Source	Title
Almanac Films, Inc.	Electricity
Aluminum Company of America or Association Films, Inc.	Electrical Wiring with Aluminum
American Gas Association	Energy for Living
Autonetics Division	Microelectronics--the Road to Reliability
Bay State Film Productions, Inc. (See Landers, November, 1961)	Just Plug it In
Bendix Corporation, The Scintilla Division	Theory of Operation of the Four-Pole Magneto
Bureau of Mines or Ideal Pictures, Inc.	Story of the Modern Storage Battery
Bureau of Reclamation	Power for a Nation
Central Scientific Company	Series and Parallel Circuits Static Electricity This is Electricity
Charles Cahill and Associates	Electricity--Wires in Your Home
Coronet Films	Electricity All About Us Electricity, How it is Generated Electricity: Principles of Safety Electrochemical Reactions Electromagnetic Induction Electrons and Electronics: An Introduction Electrostatic Charges and Forces Measurement of Electricity Ohm's Law Simple Demonstrations with Static Electricity
Consulate General of Ireland	Power for Prosperity

Outler-Hammer, Inc.	Project 4411
Encyclopedia Britannica Films	Electricity, How it is Made
	Electricity, How to Make a Circuit (Using the dry cell)
	Electrodynamics
	Electromagnets: How they Work
	Electrons at Work
	Electrostatics
	Elements of Electrical Circuits
	Home Electrical Appliances
	How to Produce Electric Current with Magnets
	Learning About Electric Current
	Magnetic, Electric and Gravitational Fields
	Series and Parallel Circuits
	The Primary Cell
Film Associates of California	Exploring Electromagnetic Energy
General Electric Films	Principles of Electricity
Henk Newenhouse	Fires and Wires
Hughes Aircraft Company	Hughes Electron News 1, 2, 3, 4 (Series Title)
Idaho Department of Commerce and Development or United States Atomic Energy Commission	New Power (Describes the AEC national reactor testing station in Idaho)
Indiana University	Electricity: Distribution
	Electricity: Measurement
Institute of Agriculture University of Minnesota	Grounding Electrical Motors
McGraw-Hill	Energy and Reaction
	Faraday's Laws
	Magnetic Force
	Magnetism and Electricity
Modern Learning Aids	Coulomb Force Constant
	Coulomb's Law
	Counting Electrical Charges in Motion
	Electric Fields
	Electric Lines of Force
	Electrical Potential Energy and Potential Difference Part I and 2
	Electromagnetic Waves
	Millikan Experiment

Modern Talking Pictures	Easy Does It
National Electrical Manufacturers' Association Armored Cable Section	Installing Armored Cable
Norwood Films	Cable Surface Wiring Electrical Circuit Faults Installing Conduit Installing Surface Metal Raceway Joining Solid Connectors Maintaining Good Voltage on Rural Distribution Lines Preparing Old Buildings for Wiring Reduced Voltage Starters Roughing-in Nonmetallic Sheathed Soldering Lugs and Splicing Stranded Conductors Three-Wire Service and Voltage Drop Wire Sizes and Voltage Drop Wiring Old Buildings with Armored Cable
RCA Institutes, Inc.	Your Future in Electronics
Techtronics, Inc.	Cathode Ray Tube, Window to Electronics Ceramics and Electronics Solving the Unvalanced Bridge Sounds of Progress Square Wave Transmission Lines
Tennessee Valley Authority	Power from Paradise
United States Army	Electrician Electronics Technician
United States Atomic Energy Commission	Army Package Power Reactor

Note: The U.S. Atomic Energy Commission provides a number of motion pictures on the production of electrical power by atomic reactors.

United States Rural Electrification Administration	REA Story

Filmstrips

Source	Title
Norwood Films	Alternating Current
	Current and Electromotive Force
	Refrigeration
	Series and Parallel Circuits
	Wire Sizes and Voltage Drop
	Wiring Old Buildings with Armored Cable
Westinghouse Electric Corporation	Ten Checks of Electrical Control Maintenance

8mm Loop Films

Source	Title
Cenco Educational Films	Constant Voltage - Depolarization
	Electric Current and Its Magnetic Field
	Electricity and Different Materials
	Electricity (Static) by Induction and Conduction
	Lead-Acid Storage Battery
	Magnetic Fields Part 1 and 2
	Magnetism Produces Electricity
	Ohm's Law
	Resistance
	Resistors in Series and Parallel
	Voltaic Cells
	Voltaic Cells in Series and Parallel
	What is Electricity? (Statis)
	What is Magnetism?
World Wide Pictures Limited (Information from E. K. Hill)	AC Dynamo
	DC Dynamo
	DC Motor

Graphics Materials

Source	Title
Visual Products Division of the 3M Company	Overhead Transparency Master in the Area of Electricity and Electronics
Kueffel and Esser Company	Overhead Transparency Masters from the Physics Series

Note: Information is available on materials in the areas of electric furnaces, electric heating, electric insulators and insulation, electric lamps, electric lighting installations, electric lines, electric machinery maintenance and repairs, electric meters, electric motors, electric power distribution, electric power plants, electric shock, electric transformers and electrical fences.

Note: For films in the area of mechanical drawing and drafting, welding and metallurgy and electricity and electronics, refer to the 1966 listing of motion pictures for engineering education compiled by the Commission on Engineering Education (these films would be for advanced high school classes or general college engineering classes).

ELECTRICITY DEFINED

Publications	Transparencies
1. AFM 52-8, Vol. I, pp. 2-1	
2. NAVPERS 10086-A, pp. 1	
3. AFM 101-8, p. 9	

Motion Pictures

1. A-10
2. A-17
3. A-24

CONDUCTORS AND INSULATORS

INTRODUCTION

Publications	Transparencies
1. AFM 101-8, p. 10	
2. AFM 52-8, Vol. I, p. 2-2; 8-5 to 8-6	
3. NAVPERS 10086-A, p. 4	

CONDUCTORS AND INSULATORS

CONDUCTORS - PHYSICAL FEATURES AND ELECTRICAL CHARACTERISTICS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 95 - 102	1. NAVPERS 70503-III-6-5
	2. NAVPERS 70503-III-6-6
	3. NAVPERS 70503-V-6-7

CONDUCTORS AND INSULATORS

INSULATORS - PHYSICAL FEATURES AND ELECTRICAL CHARACTERISTICS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 102 - 107	

STATIC ELECTRICITY

FUNDAMENTALS

Publications

1. NAVPERS 10086-A, pp. 4 - 6
2. AFM 52-8, Vol. 1, pp. 2-2 thru 2-5
3. AFM 101-8, pp. 3 - 8

Transparencies

1. NAVPERS 70503-11-2-2
2. NAVPERS 70503-11-3-1
3. NAVPERS 70503-11-3-2
4. NAVPERS 70503-11-3-3
5. NAVPERS 70503-11-3-4
6. NAVPERS 70503-11-3-5
7. NAVPERS 70503-11-3-6
8. NAVPERS 70503-11-3-7
9. NAVPERS 70503-11-3-12
10. NAVPERS 70503-11-3-13
11. NAVPERS 70503-11-3-14
12. NAVPERS 70503-11-3-18

Motion Pictures

1. A-9
2. B-1

ELECTRON THEORY

Publications

1. NAVPERS 10086-A, pp. 1 - 4
2. AFM 52-8, Vol. 1, pp. 2-1 to 2-2
3. AFM 101-8, pp. 13 - 15

Transparencies

1. NAVPERS 70503-11-2-1
2. NAVPERS 70503-11-1-6
3. NAVPERS 70503-11-1-8
4. NAVPERS 70503-11-1-9
5. NAVPERS 70503-111-1-1
6. NAVPERS 70503-111-1-2
7. NAVPERS 70503-111-1-3
8. NAVPERS 70503-111-1-4

Motion Pictures

1. A-5
2. A-8

METHODS OF PRODUCING ELECTRICITY

Publications

1. NAVPERS 10086-A, pp. 15 - 19
2. AFM 101-8, pp. 15 - 16

Transparencies

1. NAVPERS 70503-11-10-1
2. NAVPERS 70503-11-6-1

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1. NAVPERS 10086-A, pp. 23 - 24
2. AFM 52-8, Vol. I, pp. 2-7 to 2-9
3. AFM 101-8, pp. 21 - 23

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1. NAVPERS 70503-11-8-2
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1. NAVPERS 10086-A, pp. 24-26	
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1. NAVPERS 10086-A, pp. 26 - 29, 30 - 41
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3. AFM 101-8, pp. 21- 23

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1. NAVPERS 70503-11-8-4
2. NAVPERS 70503-11-9-1
3. NAVPERS 70503-11-9-2

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1. AFM 101-8, pp. 24 - 25
2. AFM 52-8, Vol. I, pp. 2-11
3. NAVPERS 10086-A, pp. 29 - 30

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1. NAVPERS 70503-11-8-9

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1. NAVPERS 10086-A, pp. 14 - 15;
   19 - 20
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3. AFM 101-8, pp. 13 - 15

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1. NAVPERS 70503-111-2-1
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12. NAVPERS 70503-111-6-7
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1. NAVPERS 10086-A, pp. 44 - 47
2. AFM 52-8, Vol. I, p. 2-7
3. AFM 101-8, p. 19

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1. NAVPERS 70503-IV-4-13

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1. AFM 101-8, pp. 28 - 29
2. AFM 52-8, Vol. I, p. 2-7
3. NAVPERS 10086-A, pp. 47 - 52

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1. NAVPERS 70503-IV-5-2
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1. NAVPERS 10086-A, pp. 50 - 51
2. AFM 101-8, p. 26

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1. NAVPERS 70503-IV-5-6
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1. AFM 101-8, pp. 10 - 11, 40 - 42
2. AFM 52-8, Vol. I, pp. 2-11 to 2-12
3. NAVPERS 10086-A, p. 50

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1. NAVPERS 70503-111-6-13
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1. NAVPERS 10086-A, pp. 388; 397	1. NAVPERS 70503-111-6-16
2. AFM 101-8, p. 12	2. NAVPERS 70503-111-6-17
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1. NAVPERS 10086-A, p. 57
2. AFM 52-8, Vol. I, p. 2-12
3. AFM 101-8, p. 27

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1. NAVPERS 70503-IV-1-1
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1. NAVPERS 10086-A, pp. 58, 60
2. AFM 52-8, Vol. I, p. 2-12
3. AFM 101-8, p. 27

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1. NAVPERS 70503-IV-3-1
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1. AFM 101-8, pp. 27 - 28
2. AFM 52-8, Vol. I, p. 2-6
3. NAVPERS 10086-A, p. 57

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1. NAVPERS 70503-IV-4-1
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3. NAVPERS 70503-IV-4-3
4. NAVPERS 70503-IV-4-4
5. NAVPERS 70503-IV-4-5
6. NAVPERS 70503-IV-4-6
7. NAVPERS 70503-IV-4-7
8. NAVPERS 70503-IV-4-8

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1. NAVPERS 10086-A, pp. 63 - 64	

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1. AFM 52-8, Vol. I, pp. 2-12 to 2-14	
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1. NAVPERS 10086-A, p. 64	1. NAVPERS 70503-IV-6-1
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1. AFM 52-8, Vol. I, pp. 2-14 to 2-16
2. AFM 101-8, p. 34
3. NAVPERS 10086-A, pp. 66 - 67

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1. NAVPERS 70503-IV-6-2
2. NAVPERS 70503-IV-6-4
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Publications	Transparencies
1. AFM 52-8, Vol. 1, p. 2-16	
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1. NAVPERS 10086-A, pp. 64 - 67
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1. AFM 52-8, Vol. I, pp. 2-17 to 2-18
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1. NAVPERS 10086-A, pp. 67 - 68, 69 - 71

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1. NAVPERS 10086-A, pp. 82 - 83	

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1. NAVPERS 10086-A, pp. 7 - 14
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1. AFM 52-8, Vol. I, p. 2-24	
2. NAVPERS 10086-A, p. 120	
3. AFM 101-8, p. 47	

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MAGNETIC FIELD AROUND A CURRENT-CARRYING CONDUCTOR

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1. AFM 101-8, pp. 47 - 48
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3. NAVPERS 10086-A, pp. 120 - 121

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1. NP 17501-94
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1. AFM 101-8, p. 48
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3. NAVPERS 10086-A, pp. 121 - 122

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1. NAVPERS 70503-V-2-3
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1. AFM 101-8, pp. 51 - 53
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1. NAVPERS 70503-V-3-9
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1. AFM 101-8, pp. 76 - 77
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1. AFM 52-8, Vol. I, pp. 3-9 thru 3-10
2. NAVPERS 10086-A, pp. 212 - 213

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1. NAVPERS 70503-VI-2-4

BASIC ELECTRICAL INDICATING INSTRUMENTS

THERMOCOUPLE - TYPE METERS

Publications

1. AFM 101-8, pp. 78 - 79
2. AFM 52-8, Vol. I, pp. 3-13 to 3-14
3. NAVPERS 10086-A, p. 214
4. NAVPERS 10636-F, p. 72

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1. NAVPERS 70503-VI-2-5

BASIC ELECTRICAL INDICATING INSTRUMENTS

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1. AFM 52-8, Vol. I, pp. 3-16 thru 3-17	

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1. AFM 52-8, Vol. I, pp. 3-17 to 3-27
2. NAVPERS 10087-B, pp. 481 - 486
3. AFM 101-8, pp. 189 - 196

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1. NAVPERS 70503-VI-1-X5
2. NAVPERS 70503-VI-1-X6
3. NAVPERS 70503-VI-1-X7
4. NAVPERS 70503-VI-1-X8

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1. A-3
2. A-4

BASIC ELECTRICAL INDICATING INSTRUMENTS

METER EFFECTS ON CIRCUITS

Publications	Transparencies
1. AFM 52-8, Vol. I, pp. 3-6 to 3-8	
2. AFM 101-8, pp. 79 - 80	
3. NAVPERS 10086-A, p. 205	

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1. AFM 101-8, pp. 81 - 86
2. AFM 52-8, Vol. I, pp. 2-52 to 2-54
3. NAVPERS 10086-A, pp. 131 - 138

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1. NAVPERS 70503-VI-1-1
2. NAVPERS 70503-VI-1-2
3. NAVPERS 70503-VI-1-3
4. NAVPERS 70503-VI-1-4
5. NAVPERS 70503-VI-1-5
6. NAVPERS 70503-VI-1-6
7. NAVPERS 70503-VI-1-7
8. NAVPERS 70503-VI-1-8
9. NAVPERS 70503-VI-1-9
10. NAVPERS 70503-VI-1-10
11. NAVPERS 70503-VI-1-20

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1. A-16

INDUCTANCE AND INDUCTIVE REACTANCE

INTRODUCTION

Publications

1. AFM 101-8, pp. 87 - 90
2. AFM 52-8, Vol. I, p. 2-54
3. NAVPERS 10086-A, p. 140

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1. NAVPERS 70503-VI-4-1
2. NAVPERS 70503-VI-4-2
3. NAVPERS 70503-VI-4-3
4. NAVPERS 70503-VI-4-4

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1. A-11

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SELF AND MUTUAL INDUCTANCE

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1. AFM 101-8, pp. 90 - 91
2. AFM 52-8, VOL. 1, pp. 2-30 to 2-31
3. NAVPERS 10086-A, pp. 140 - 147

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1. NAVPERS 70503-V1-4-5
2. NAVPERS 70503-V1-4-6
3. NAVPERS 70503-V1-4-8
4. NAVPERS 70503-V1-4-9
5. NAVPERS 70503-V1-4-10

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1. A-11

INDUCTANCE AND INDUCTIVE REACTANCE

INDUCTIVE REACTANCE

Publications	Transparencies
1. AFM 101-8, pp. 91 - 92	
2. AFM 52-8, Vol. 1, p. 2-55	
3. NAVPERS 10086-A, p. 162	

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SERIES AND PARALLEL CONNECTIONS

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1. AFM 101-8, pp. 92 - 94	
2. AFM 52-8, Vol. I, p. 2-55	
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1. AFM 101-8, pp. 94 - 95	

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1. AFM 101-8, pp. 95 - 98	
2. AFM 52-8, Vol. 1, pp. 2-60 thru 2-61	

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1. NAVPERS 10086-A, pp. 147 - 149
2. AFM 101-8, p. 91
3. AFM 52-8, Vol. 1, pp. 2-54 to 2-55; 2-63

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1. NAVPERS 70503-V1-4-15
2. NAVPERS 70503-V1-4-16
3. NAVPERS 70503-V1-4-17

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R-L TIME CONSTANT

Publications

1. NAVPERS 10086-A, p. 144
2. AFM 52-8, Vol. I, pp. 6-17 thru 6-25

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1. NAVPERS 70503-VI-4-11
2. NAVPERS 70503-VI-4-12
3. NAVPERS 70503-VI-4-13

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1. NAVPERS 10086-A, pp. 162 - 163
2. AFM 101-8, pp. 120 - 121
3. AFM 52-8, Vol. I, p. 2-63

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1. NAVPERS 70503-VI-5-3

CAPACITANCE AND CAPACITIVE REACTANCE

INTRODUCTION

Publications

1. AFM 101-8, pp. 99 - 102
2. AFM 52-8, Vol. I, pp. 2-55 thru 2-56
3. NAVPERS 10086-A, pp. 149 - 151

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1. A-2

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1. NAVPERS 70503-VI-6-1
2. NAVPERS 70503-VI-6-2
3. NAVPERS 70503-VI-6-3
4. NAVPERS 70503-VI-6-4
5. NAVPERS 70503-VI-6-5
6. NP 70503-V-6-6
7. NAVPERS 70503-VI-6-7
8. NAVPERS 70503-VI-6-8
9. NAVPERS 70503-VI-6-11
10. NAVPERS 70503-VI-7-1
11. NAVPERS 70503-VI-7-2
12. NAVPERS 70503-VI-7-3
13. NAVPERS 70503-VI-7-4

CAPACITANCE AND CAPACITIVE REACTANCE

CAPACITIVE REACTANCE

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1. AFM 101-8, pp. 102 - 103	1. NAVPERS 70503-VI-7-17
2. AFM 52-8, Vol. I, p. 2-57	
3. NAVPERS 10086-A, pp. 166 - 167	

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CAPACITORS CONNECTED IN SERIES AND PARALLEL

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1. NAVPERS 10086-A, pp. 155 - 156	1. NAVPERS 70503-VI-7-5
2. AFM 52-8, Vol. I, pp. 2-56 to 2-57	
3. AFM 101-8, pp. 103 - 104	

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CURRENT FLOW IN A CAPACITIVE CIRCUIT

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1. NAVPERS 10086-A, p. 166
2. AFM 101-8, p. 102
3. AFM 52-8, Vol. I, pp. 2-62 thru 2-63

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1. NAVPERS 70503-VI-7-16
2. NAVPERS 70503-VI-7-19

CAPACITANCE AND CAPACITIVE REACTANCE

POWER LOSSES IN CAPACITORS

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1. AFM 101-8, pp. 104 - 105	

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VOLTAGE RATINGS OF CAPACITORS

Publications

1. AFM 101-8, p. 105
2. NAVPERS 10086-A, pp. 156 - 157

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1. NAVPERS 70503-VI-7-7

CAPACITANCE AND CAPACITIVE REACTANCE

TYPICAL CAPACITORS

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1. AFM 101-8, pp. 105 - 106
2. AFM 52-8, Vol. I, pp. 2-58 to 2-60
3. NAVPERS 10086-A, pp. 157 - 159

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1. NAVPERS 70503-VI-7-6
2. NAVPERS 70503-VI-7-7
3. NAVPERS 70503-VI-7-8
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5. NAVPERS 70503-VI-7-10
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RC TIME CONSTANT

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1. AFM 101-8, pp. 286 - 290; 296
2. AFM 52-8, Vol. I, pp. 6-6 to 6-16
3. NAVPERS 10086-A, pp. 151 - 155

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1. NAVPERS 70503-VI-7-14

CAPACITANCE AND CAPACITIVE REACTANCE

CAPACITOR COLOR CODE

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1. NAVPERS 10086-A, pp. 398 - 400

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1. NAVPERS 70503-VI-7-12
2. NAVPERS 70503-VI-7-13

CAPACITANCE AND CAPACITIVE REACTANCE

POWER IN A CAPACITIVE CIRCUIT

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1. AFM 52-8, Vol. I, pp. 2-62 thru 2-63
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1. NAVPERS 70503-VI-7-20

A. C. SERIES CIRCUITS

INTRODUCTION

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1. AFM 101-8, p. 115	1. NAVPERS 70503-VI-8-1

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RESISTIVE A. C. CIRCUITS AND A. C. POWER

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1. AFM 101-8, p. 116
2. AFM 52-8, Vol. I, pp. 2-61 thru 2-62
3. NAVPERS 10086-A, pp. 163 - 164

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1. NAVPERS 70503-VI-3-2
2. NAVPERS 70503-VI-3-3
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A. C. SERIES CIRCUITS

RESISTANCE AND INDUCTANCE IN SERIES

Publications

1. AFM 101-8, pp. 116 - 121
2. AFM 52-8, Vol. I, pp. 2-63 thru 2-65
3. NAVPERS 10086-A, pp. 164 - 166

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1. NAVPERS 70503-VI-8-3
2. NAVPERS 70503-VI-8-4
3. NAVPERS 70503-VI-8-5
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5. NAVPERS 70503-VI-9-4

A. C. SERIES CIRCUITS

RESISTANCE AND CAPACITANCE IN SERIES

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1. AFM 101-8, pp. 121 - 124
2. AFM 52-8, Vol. 1, pp. 2-65 thru 2-66
3. NAVPERS 10086-A, pp. 168 - 169

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1. NAVPERS 70503-VI-8-8
2. NAVPERS 70503-VI-8-9
3. NAVPERS 70503-VI-8-10
4. NAVPERS 70503-VI-9-5

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1. A-19

A. C. SERIES CIRCUITS

RESISTANCE, CAPACITANCE AND INDUCTANCE IN SERIES

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1. AFM 101-8, pp. 124 - 126	1. NAVPERS 70503-VI-8-11
2. AFM 52-8, Vol. I, p. 2-68	2. NAVPERS 70503-VI-8-12
3. NAVPERS 10086-A, pp. 172 - 173	3. NAVPERS 70503-VI-8-17
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A. C. PARALLEL CIRCUITS

RESISTIVE A. C. CIRCUITS AND A. C. POWER

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1. AFM 52-8, Vol. I, p. 2-72
2. NAVPERS 10086-A, pp. 163 - 164

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1. NAVPERS 70503-VI-3-2
2. NAVPERS 70503-VI-3-3
3. NAVPERS 70503-VI-3-4
4. NAVPERS 70503-VI-3-12

A. C. PARALLEL CIRCUITS

RESISTANCE AND INDUCTANCE IN PARALLEL

Publications

1. AFM 101-8, pp. 128 - 130
2. AFM 52-8, Vol. I, pp. 2-75 to 2-77
3. NAVPERS 10086-A, pp. 173 - 179

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1. NAVPERS 70503-VI-10-5

A. C. PARALLEL CIRCUITS

RESISTANCE AND CAPACITANCE IN PARALLEL

Publications

1. AFM 101-8, pp. 130 - 132
2. AFM 52-8, Vol. 1, pp. 2-73 thru 2-75
3. NAVPERS 10086-A, pp. 179 - 186

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1. NAVPERS 70503-VI-10-6

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1. A-19

A. C. PARALLEL CIRCUITS

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Publications

1. AFM 101-8, pp. 132 - 134
2. AFM 52-8, Vol. I, pp. 2-77 thru 2-79
3. NAVPERS 10085-A, pp. 186 - 190

Transparencies

1. NAVPERS 70503-VI-10-4
2. NAVPERS 70503-VI-10-7
3. NAVPERS 70503-VI-10-8
4. NAVPERS 70503-VI-10-9
5. NAVPERS 70503-VI-10-10
6. NAVPERS 70503-VI-10-16

A. C. COMPLEX, SERIES - PARALLEL CIRCUITS

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1. AFM 52-8, Vol. I, pp. 2-79 to 2-81

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1. NAVPERS 70503-VI-12-1
2. NAVPERS 70503-VI-12-2
3. NAVPERS 70503-VI-12-3
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RESONANCE IN A. C. CIRCUITS

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Publications	**Transparencies**
1. AFM 101-8, pp. 135 - 136	
2. NAVPERS 10087-B, pp. 82 - 83	
3. NAVPERS 10084, p. 52	

RESONANCE IN A. C. CIRCUITS

SERIES RESONANCE

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1. AFM 101-8, pp. 136 - 144
2. AFM 52-8, Vol. I, pp. 2-69 to 2-72
3. NAVPERS 10087-B, pp. 89 - 96
4. NAVPERS 10084, pp. 52 - 53

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1. NAVPERS 70503-VI-9-8
2. NAVPERS 70503-VI-9-9

RESONANCE IN A. C. CIRCUITS

PARALLEL RESONANCE

Publications

1. AFM 101-8, pp. 144 - 148
2. AFM 52-8, Vol. I, pp. 2-81 thru 2-85
3. NAVPERS 10087-B, pp. 96 - 102
4. NAVPERS 10084, pp. 53 - 55

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1. NAVPERS 70503-VI-11-1
2. NAVPERS 70503-VI-11-2
3. NAVPERS 70503-VI-11-6

EFFECTIVE RESISTANCE

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1. NAVPERS 10086-A, pp. 190 - 193	

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1. AFM 101-8, pp. 107 - 110
2. AFM 52-8, Vol. I, pp. 2-93 thru 2-94
3. NAVPERS 10086-A, pp. 233 - 236

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1. NAVPERS 70503-VII-1-3
2. NAVPERS 70503-VII-1-5
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4. NAVPERS 70503-VII-1-11
5. NAVPERS 70503-VII-1-12
6. NAVPERS 70503-VII-1-13

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1. AFM 101-8, pp. 110 - 111
2. AFM 52-8, Vol. I, pp. 2-96 thru 2-99
3. NAVPERS 10086-A, pp. 236 - 239

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1. NAVPERS 70503-VII-1-4
2. NAVPERS 70503-VII-1-18

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1. AFM 101-8, p. 111	
2. AFM 52-8, Vol. I, p. 2-95	

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1. NAVPERS 10086-A, p. 239
2. AFM 52-8, Vol. I, pp. 2-99 to 2-100

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1. NAVPERS 70503-VII-1-6

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TYPES OF TRANSFORMERS

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1. AFM 101-8, pp. 111 - 114
2. AFM 52-8, Vol. 1, pp. 2-100 to 2-104
3. NAVPERS 10086-A, pp. 239 - 244; 333 - 336; 371 - 374

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1. NAVPERS 70503-VII-1-7
2. NAVPERS 70503-VII-1-8
3. NAVPERS 70503-VII-1-9
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A. C. GENERATORS

INTRODUCTION

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1. AFM 101-8, pp. 56 - 57
2. AFM 52-8, Vol. 1, pp. 2-32 to 2=34
3. NAVPERS 10086-A, pp. 131 - 133; 217

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1. NAVPERS 70503-VII-2-1
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1. A-16

A. C. GENERATORS

TYPES OF GENERATORS

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1. NAVPERS 10086-A, pp. 217 - 228	1. NAVPERS 70503-VII-2-3
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MEASUREMENT OF POWER

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1. NAVPERS 10086-A, p. 228	

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1. NAVPERS 10086-A, pp. 230 - 231	

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1. NAVPERS 10086-A, pp. 231 - 233	

A. C. MOTORS

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1. NAVPERS 10086-A, p. 246	

A. C. MOTORS

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1. NAVPERS 10086-A, pp. 246 - 248
2. AFM 52-8, Vol. I, pp. 2-48 to 2-51

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1. NAVPERS 70503-VII-3-1
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A. C. MOTORS

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1. NAVPERS 10086-A, pp. 248 - 255
2. AFM 52-8, Vol. I, pp. 2-48 thru 2-51
3. NAVPERS 10636-F, pp. 92 - 100

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1. NAVPERS 70503-VII-3-6
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4. NAVPERS 70503-VII-3-9
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A. C. MOTORS

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1. NAVPERS 10086-A, pp. 255 - 259
2. AFM 52-8, Vol. I, pp. 2-51 to 2-52

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1. AFM 101-8, p. 105	1. NAVPERS 70503-VI-7-7
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TYPICAL CAPACITORS

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1. AFM 101-8, pp. 105 - 106
2. AFM 52-8, Vol. I, pp. 2-58 to 2-60
3. NAVPERS 10086-A, pp. 157 - 159

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1. NAVPERS 70503-VI-7-6
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4. NAVPERS 70503-VI-7-9
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CAPACITANCE AND CAPACITIVE REACTANCE

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POWER IN A CAPACITIVE CIRCUIT

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1. AFM 52-8, Vol. I, pp. 2-62 thru 2-63
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CAPACITANCE AND CAPACITIVE REACTANCE

CAPACITOR COLOR CODE

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1. NAVPERS 10086-A, pp. 398 - 400

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1. NAVPERS 70503-VI-7-12
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A. C. SERIES CIRCUITS

INTRODUCTION

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1. AFM 101-8, p. 115	1. NAVPERS 70503-V1-8-1

A. C. SERIES CIRCUITS

RESISTIVE A. C. CIRCUITS AND A. C. POWER

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1. AFM 101-8, p. 116
2. AFM 52-8, Vol. 1, pp. 2-61 thru 2-62
3. NAVPERS 10086-A, pp. 163 - 164

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1. NAVPERS 70503-V1-3-2
2. NAVPERS 70503-V1-3-3
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A. C. SERIES CIRCUITS

RESISTANCE AND INDUCTANCE IN SERIES

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1. AFM 101-8, pp. 116 - 121
2. AFM 52-8, Vol. 1, pp. 2-63 thru 2-65
3. NAVPERS 10086-A, pp. 164 - 166

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1. NAVPERS 70503-V1-8-3
2. NAVPERS 70503-V1-8-4
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A. C. SERIES CIRCUITS

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1. AFM 101-8, pp. 121 - 124
2. AFM 52-8, Vol. I, pp. 2-65 thru 2-66
3. NAVPERS 10086-A, pp. 168 - 169

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1. NAVPERS 70503-VI-8-8
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1. A-19

A. C. SERIES CIRCUITS

RESISTANCE, CAPACITANCE AND INDUCTANCE IN SERIES

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1. AFM 101-8, pp. 124 - 126
2. AFM 52-8, Vol. 1, p. 2-68
3. NAVPERS 10086-A, pp. 172 - 173

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1. NAVPERS 70503-V1-8-11
2. NAVPERS 70503-V1-8-12
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4. NAVPERS 70503-V1-9-1
5. NAVPERS 70503-V1-9-2
6. NAVPERS 70503-V1-9-6
7. NAVPERS 70503-V1-9-7
8. NAVPERS 70503-V1-9-16

A. C. PARALLEL CIRCUITS

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1. AFM 101-8, p. 127

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1. NAVPERS 70503-VI-10-1
2. NAVPERS 70503-VI-10-2

A. C. PARALLEL CIRCUITS

RESISTIVE A. C. CIRCUITS AND A. C. POWER

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1. AFM 52-8, Vol. 1, p. 2-72
2. NAVPERS 10086-A, pp. 163 - 164

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1. NAVPERS 70503-VI-3-2
2. NAVPERS 70503-VI-3-3
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A. C. MOTORS

A. C. MOTOR STARTERS

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1. NAVPERS 10086-A, pp. 259 - 260	
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1. NAVPERS 10086-A, pp. 260 - 266
2. AFM 52-8, Vol. I, pp. 2-48; 2-51
3. NAVPERS 10636-F, pp. 85 - 92

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1. NAVPERS 70503-VII-3-11
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4. NAVPERS 70503-VII-3-15
5. NAVPERS 70503-VII-3-28

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2. AFM 52-8, Vol. I, p. 3-9	

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1. NAVPERS 10086-A, p. 328
2. AFM 52-8, Vol. I, pp. 3-14 thru 3-15

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1. NAVPERS 70503-VI-2-2
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A. C. INSTRUMENTS

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1. NAVPERS 10086-A, pp. 329 - 330
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1. NAVPERS 70503-VI-3-6
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A. C. INSTRUMENTS

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1. NAVPERS 10086-A, pp. 330 - 333	

A. C. INSTRUMENTS

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1. NAVPERS 10086-A, pp. 336 - 337	

A. C. INSTRUMENTS

FREQUENCY METERS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 337 - 340	
2. NAVPERS 10636-F, pp. 71 - 72	

A. C. INSTRUMENTS

SINGLE-PHASE POWER-FACTOR METERS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 340 - 342	
2. NAVPERS 10636-F, pp. 67 - 68	

MAGNETIC AMPLIFIERS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 344 - 352	

SYNCHROS AND SERVOMECHANISMS

Publications	Transparencies
1. AFM 101-8, pp. 471 - 504	1. NAVPERS 70503-VII-3-17
2. NAVPERS 10086-A, pp. 354 - 385	

WIRING TECHNIQUES

INTERIOR WIRING

Publications	Transparencies
1. NAVPERS 10636-F, pp. 131 - 155	

WIRING TECHNIQUES

CONDUCTOR SPLICES AND TERMINAL CONNECTIONS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 107 - 110	
2. NAVPERS 10636-F, pp. 155 - 160	

WIRING TECHNIQUES

SOLDERING EQUIPMENT

Publications

1. NAVPERS 10086-A, pp. 110 - 113

Transparencies

1. NAVPERS 70503-IV-2-7
2. NAVPERS 70503-IV-2-8

WIRING TECHNIQUES

TAPING A SPLICE

Publications	Transparencies
1. NAVPERS 10086-A, pp. 113 - 115	

WIRING TECHNIQUES

SOLDER CONNECTORS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 115 - 116	1. NAVPERS 70503-IV-2-10

WIRING TECHNIQUES

SOLDERLESS CONNECTORS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 116 - 118	

SHOP WORK

REPAIRS TO GENERATORS AND MOTORS

Publications	Transparencies
1. NAVPERS 10636-F, pp. 116 - 127	

SHOP WORK

PROTECTIVE DEVICES

Publications	Transparencies
1. NAVPERS 10636-F, p. 127	

SHOP WORK

GROUNDING EQUIPMENT

Publications	Transparencies
1. NAVPERS 10636-F, pp. 128 - 129	

ELECTRICAL DRAWINGS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 388 - 396; 401 - 403	
2. AFM 101-8, pp. 553 - 556, 18	
3. NAVPERS 10636-F, pp. 48 - 56	

SAFETY

Publications

1. NAVPERS 10086-A, pp. 408 - 414
2. NAVPERS 10636-F, pp. 78 - 83; 129 - 130

Transparencies

Motion Pictures

1. B-2

GREEK ALPHABET

Publications	Transparencies
1. NAVPERS 10086-A, p. 423	

COMMON ABBREVIATIONS AND LETTER SYMBOLS

Publications	Transparencies
1. NAVPERS 10086-A, p. 424	

ELECTRICAL TERMS AND FORMULAS

Publications	Transparencies
1. NAVPERS 10086-A, pp. 425 - 430	
2. AFM 52-8, Vol. 1, pp. 1 - 6 (Attachment 1)	

MATHEMATICS FOR ELECTRICITY

Publications	Transparencies
1. NAVPERS 10086-A, pp. 431 - 439	
2. AFM 52-8, Vol. I, pp. 1-1 thru 1-22; 7 - 22 (Attachment 2)	
3. AFM 101-8, pp. 507 - 552	